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LANDSAT 4 BAND 6 DATA EVALUATION

Contract #NAS5-27323

Third Quarterly Report

June 15, 1983

Prepared for:

NASA/Goddard Space Flight Center
Greenbelt, Maryland 20771

Objectives:

The objectives of this investigation are to evaluate and monitor the radiometric integrity of the Landsat-D Thematic Mapper (TM) thermal infrared channel (band 6) data to develop improved radiometric preprocessing calibration techniques for removal of atmospheric effects.

Problems:

None this reporting period.

Accomplishments:

The direction of analysis for this reporting period consisted of comparing computer modelled atmospheric transmittance and path radiance with empirical values derived from aircraft underflight data. Aircraft thermal infrared imagery and calibration data were available on two dates as was corresponding atmospheric radiosonde data. The radiosonde data were used as input to LOWTRAN 5A code modified to output atmospheric path radiance in addition to transmittance. The aircraft data was calibrated and utilized to generate analogous measurements. Table 1 is a summary of the results of this analysis. These data indicate that there is a tendancy for the LOWTRAN model to underestimate atmospheric path radiance and overestimate atmospheric transmittance as compared to the empirical data. Figure 1 is a plot of transmittance vs. altitude for both the LOWTRAN and empirical data. This analysis is to be expanded by the inclusion of data from additional dates where imagery and radiosonde data are available.

Significant Results:

None this reporting period.

Publications:

A draft of a paper to be presented at the SPIE 27th Annual International Technical Symposium is attached.

Recommendations:

None this reporting period.

Data Utility:

N/A

Table 1

Altitude (KM) ASL	Transmittance LOWTRAN	Transmittance Empirical	Path Radiance LOWTRAN (watts m^{-2} sr)	Path Radiance Empirical (watts m^{-2} sr)
		Data for 5/22/78		
2.6564	0.8134	0.6545	8.075	16.248
1.4372	0.8646	0.6892	6.226	15.285
0.8276	0.8953	0.7743	4.980	11.196
0.5228	0.9188	0.8461	3.873	7.493
0.3704	0.9385	0.8943	2.874	5.028
		Data for 8/14/78		
1.1324	0.7435	0.6119	15.111	20.452
0.5228	0.8632	0.7765	8.581	11.762
0.3704	0.9129	0.9033	5.514	5.085

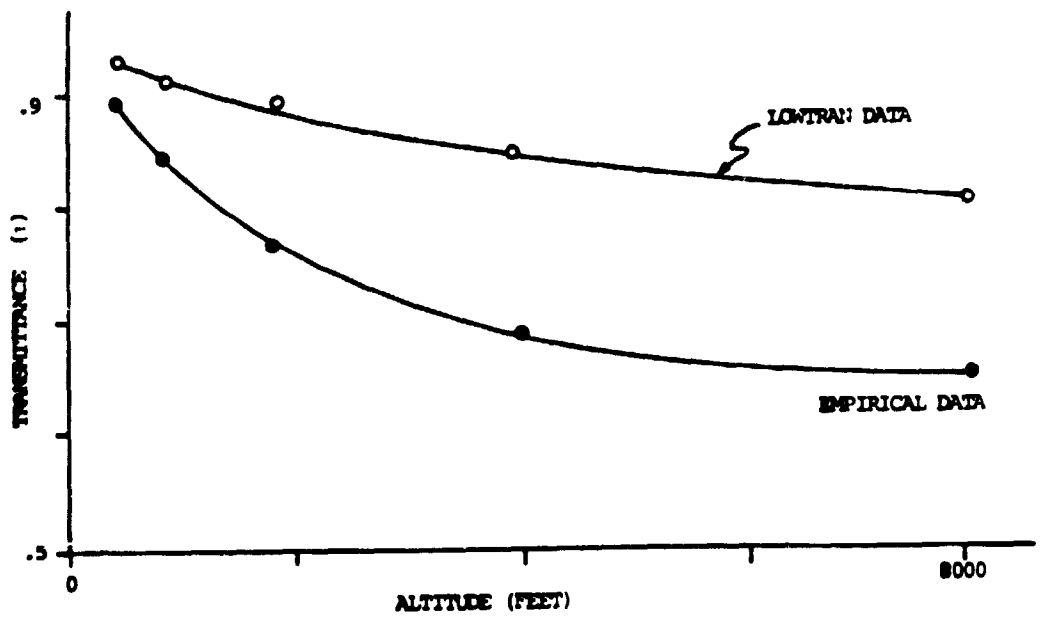

Figure 1 TRANSMITTANCE VS. ALTITUDE FOR EMPIRICAL AND LOWTRAN BASED DATA